

REMARKS

Entry of the foregoing, and consideration of the subject matter identified in caption, as amended, and in light of the remarks which follow are respectfully requested.

By the above amendments, independent claim 1 has been revised to more clearly recite that the surface treatment of the target occurs as a precursor to the use of the sputter target assembly in a deposition process. Support may be found, at least, at page 5, paragraph 13.

Turning to the Official Action, the drawings stand rejected under 37 C.F.R. §1.84(p)(5) for the reasons set forth at page 2 of the Official Action. This objection has been obviated by the attached "Replacement Sheet", wherein reference numeral 16 has been added.

Claims 1, 3, 8, and 16 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Leiphart (U.S. Patent No. 6,187,151 B1) in view of Levine et al (U.S. Patent No. 5,846,389). This rejection is traversed for the following reasons.

The present invention relates to a method of dry treating a sputtering target to achieve an enhanced finish on the surface that effectively reduces burn-in time of the target.

Leiphart is directed to a method of in-situ cleaning and deposition of device structures in a high density plasma environment. Leiphart, however, does not disclose or fairly suggest preparing the target via a dry treatment prior to its utilization in a sputtering deposition process. In this regard, Leiphart states that:

The present invention a method for in-situ plasma cleaning and sputter deposition in a single high density plasma chamber during the processing of a device structure. The present method is particularly useful for cleaning high aspect ratio device structures. (Emphasis added). Col. 1, lines 52-56.

Thus, clearly Leiphart does not contemplate pre-treating the surface of the target to reduce burn-in, nor the removal of impurities from the surface of the target, but rather discloses cleaning and depositing on the device structure during the processing of the device structure. On the other hand, in the present invention and as explained in Applicant's Specification, at pages 1-2, the preparation of the target reduces the lengthy burn-in time for targets delivered to customers (i.e., which are utilized in the deposition process). Further the pre-treatment reduces the impurities on the surface of the targets and provides for the formation of uniform film deposition during the deposition processes.

Levine et al has been applied for the alleged disclosure of a rotating magnetron behind a target. See Official Action at page 4. However, Levine et al does not cure the above-described deficiencies in Leiphart. In particular, Leiphart does not disclose the dry treatment of the target surface prior to its use in a sputtering deposition process, much less the particular power set forth in step (b) of independent claim 1.

In this regard, Levine et al states:

The rotating magnet assembly 28 provides a magnetic field adjacent the top surface 26 of the target facing the wafer to confine the ion "plasma" adjacent the target and thereby enhance the sputter coating process. Col. 3, lines 28-33.

Therefore, like Leiphart, Levine et al discloses the use of the rotating magnet during the sputter coating process, and not as a dry target surface treatment prior to the sputtering deposition process. Accordingly, even if combined in the manner suggested, the skilled artisan would not arrive at the presently claimed invention. Thus, withdrawal of this rejection is in order and it is respectfully requested.

Claims 2, 10-15, 17, 19 and 20 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Leiphart in view of Levine et al and further in view of

Ding et al (U.S. Patent Application No. 2003/0089601 A1). This rejection is traversed for the following reasons.

Leiphart and Levine et al have been discussed in detail above. Ding et al disclose an array of auxiliary magnets positioned along sidewalls of a magnetron sputter reactor on a side towards the wafer from the target. See Abstract. Ding et al has been applied for allegedly disclosing a sputtering apparatus including a rotating magnetron system "comprises less than 180 degrees". See Official Action at page 5.

Ding et al simply does not cure the deficiencies in Leiphart and Levine et al. Particularly, Ding et al does not disclose or suggest or disclose the dry treatment of the target surface prior to its use in a sputtering deposition process. Accordingly, withdrawal of this rejection is in order and it is respectfully requested. Claims 9 and 18 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Leiphart in view of Levine et al and further in view of Arai et al (U.S. Patent No. 6,187,457). This rejection is traversed.

Leiphart and Levine et al have been discussed above. Arai et al relates to an electroluminescent light emitting device using an organic compound in which an electron injecting electrode for supplying electrons to a light emitting layer is provided thereon with a sealing film. See Col. 1, lines 5-11. Arai et al has been applied for allegedly disclosing the use of FeNdB magnet. However, Arai et al does not even concern a magnetic component to be utilized in a sputtering system, much less cure the deficiencies in Leiphart and Levine et al. Thus, withdrawal of this rejection is respectfully requested.

Claims 13-15 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as allegedly being obvious over Leiphart. With respect to claim 13, it is noted that Leiphart does not disclose the magnetron sputtering apparatus disposed on less than 180° arc, as discussed above.

Regarding, claim 15 kindly note that Leiphart does not disclose or suggest a pre-treated target where the burn-in time has been reduced 10%. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 7, 8, 12 and 15 stand objected to for the informalities set forth at page 6 of the Official Action. These informalities have been corrected, as shown above. In particular, claims 8, 12, and 15 have been revised to provide the proper Markush language.

Claims 4, 7 and 15 stand rejected under 35 U.S.C. §112, second paragraph, allegedly being indefinite for the reasons set forth at page 7 of the Official Action. These rejections have been obviated by the above amendments, where the dependency of claims 4 and 7 has been corrected and claim 15 has been revised to recite a method. Thus, withdrawal of this rejection is in order and it is respectfully requested.

If there are any questions concerning this paper, or the application in general, the Examiner is invited to telephone the undersigned at his or her earliest convenience.

Respectfully submitted,



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